# The US CMS Remote Operations Center ROC)

**Dan Green**

**US CMS RP Manager**

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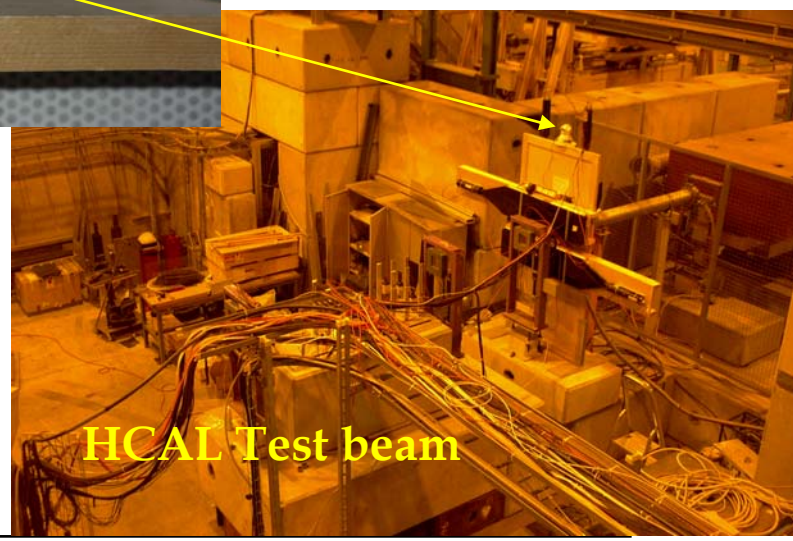
# US CMS ROC

- The idea for the ROC grew out of experience with test beam operations at CERN, 1996-2004.
- We found that firmware (HTR) and software could be debugged remotely. That allowed for fuller participation of US physicists (e.g. Maryland, Princeton).
- We deployed new tools – elog (D0), webcam (wireless – debug with LEDs), higher quality teleconf (Polycom).

# Remote Operations Center


Virtually there, 24/7



# Remote Operations Center


**TB2004 Remote Control Room (RCR) for HCAL**

mailing list: tb2004_rcr@fnal.gov RCR phone number: ext. **6364 (630 840-6364)**

**How to use CMS UAF (bigmac) for test beam 2004 analysis**

**Shift Schedule** and **Task Plan**, maintained by Shuich Kunori

**Checklist for the shift people**, maintained by Taylan Yetkin

How to run **VNC**, **VRVS**, maintained by Stefan Piperov

How to run **ViaVideo with ESNET**, from Umesh Joshi

How to run **Daily meeting with ESNET**, from Shuich Kunori

Latest Reco runs configuration list file: **reco/calib/run_config.list** , maintained by Jordan Damgov

FNAL RCR Monitoring Screen **Description** , maintained by Jordan Damgov

Wire Source Calibration **Runs** for HB1 and HE, maintained by Stefan Piperov

# ROC Prototype – TB2004 , Data Shifts

at 11th fl X-over May 26, 2004

- 3 pc's are setup
- cmsrcr01 (window)

  for communication

  via video setup via esnet

  → at hcal testbeam (CERN)

  → at emu testbeam (CERN)

  → at 11th floor (FNAL)
- cmsrcr02,03 (linux)

  for analysis

- two web-cams are setup at the hcal (done) and muon (just arrived) test beams
- e-log deployed

# The CMS Magnet Test

- The concept further evolved as it became clear that the LHC would be delayed by ~ 2 years.
- US CMS ~ stayed on the original schedule and planned “slice tests” in SX5 – debug major elements of CMS where accessible. Aim was to avoid “premature installation”.
- This idea was rejected by Trigger and DAQ and Installation CMS leaders at first. Now it is the baseline – called the “cosmic challenge”.
- CMS now plan a remote ops center on the Meyrin site. Again, this was declared a bad idea when the US first proposed it, but then adopted as the CMS baseline.

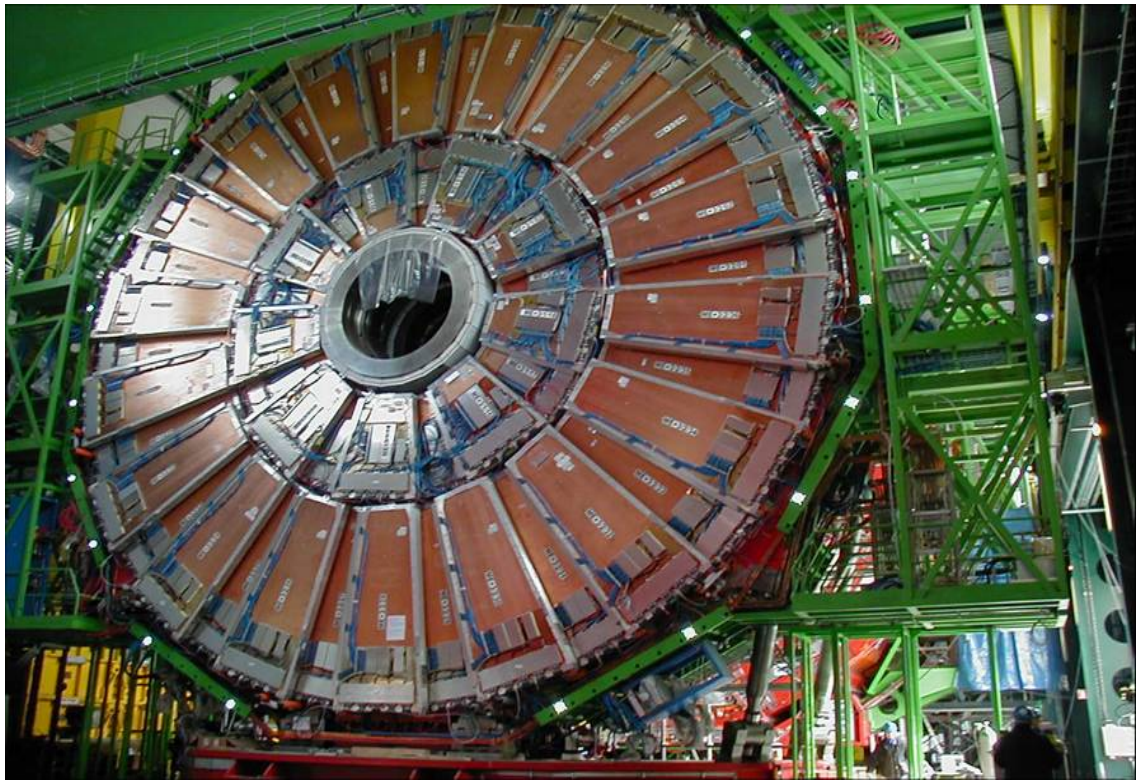
# CSC Commissioning at SX5

**Approximately 150 CSCs commissioned**

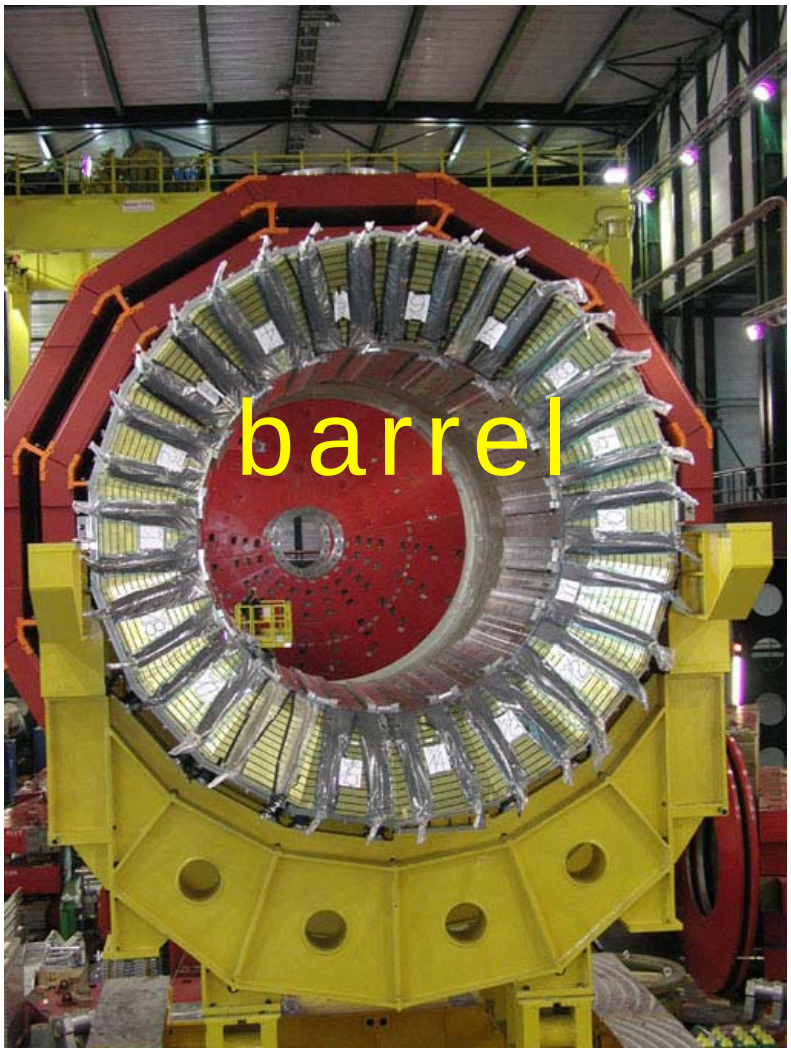
**60% installed**

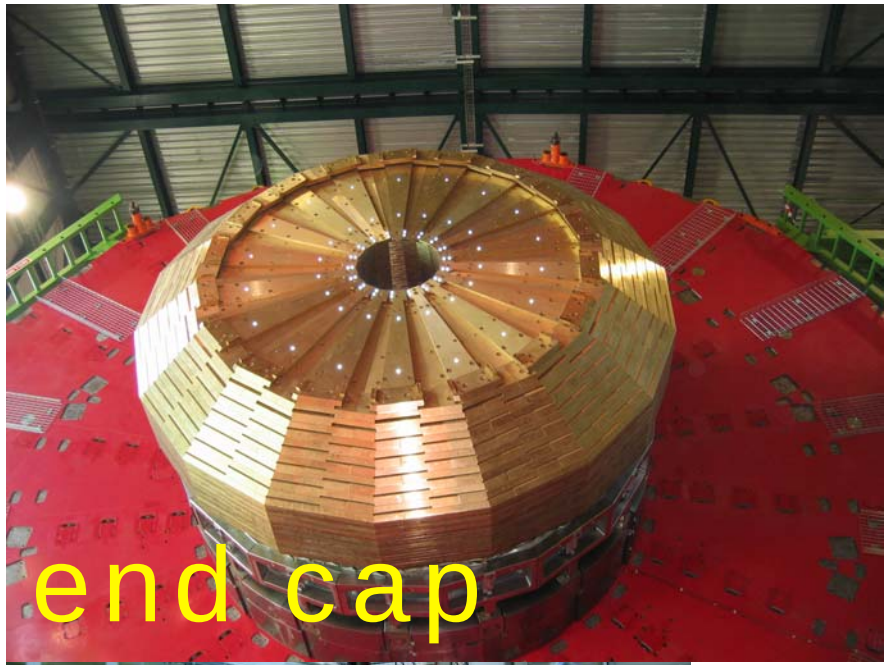
**40% commissioned**

**Slice test – muon triggers beginning in Spring ‘05 with 12 CSCs in stations ME+2 and ME+3**



# HCAL is in SX5 – Muon "Slice"



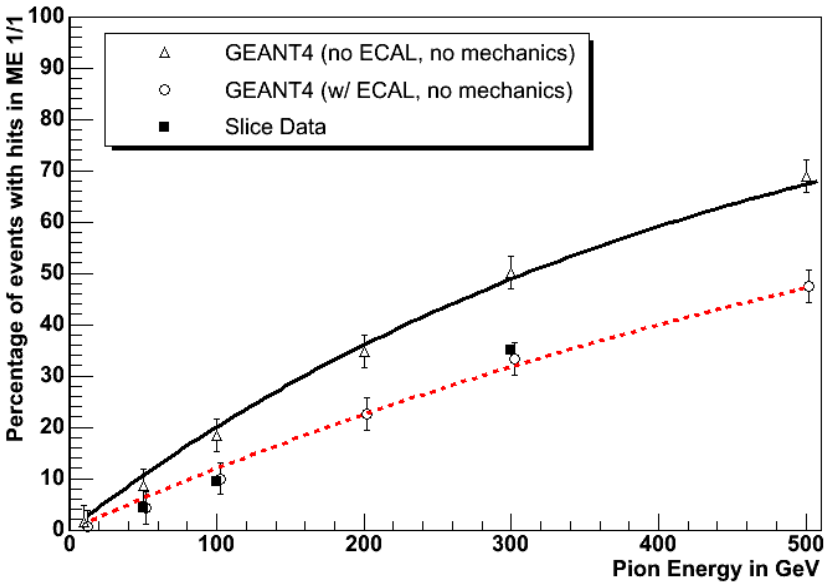




# HF in #186 – First Installed

# First HCAL-ME Slice tests

## Slice Test 2004

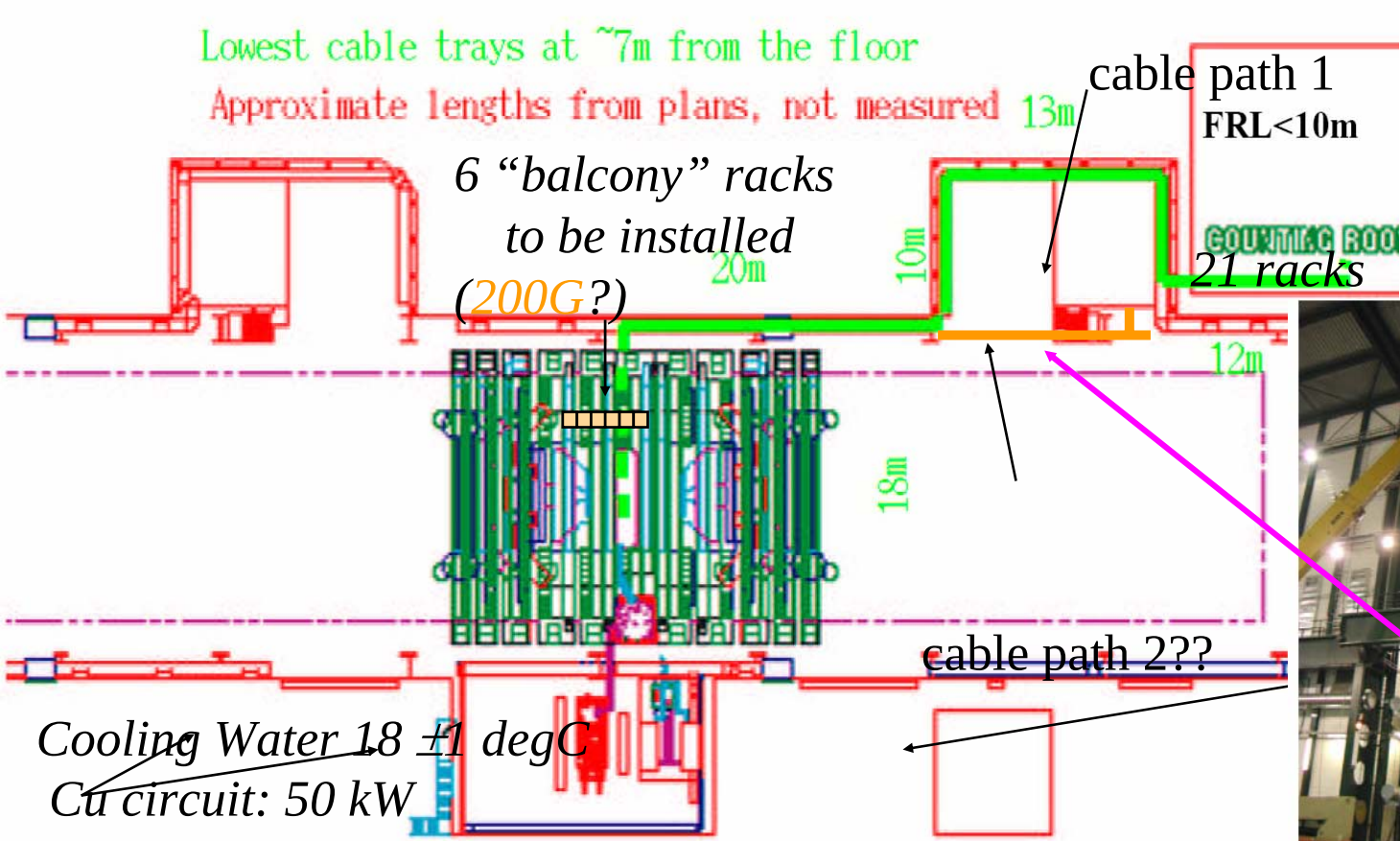
Muon-HCAL Sync.




Punch through measurement Fall 2004

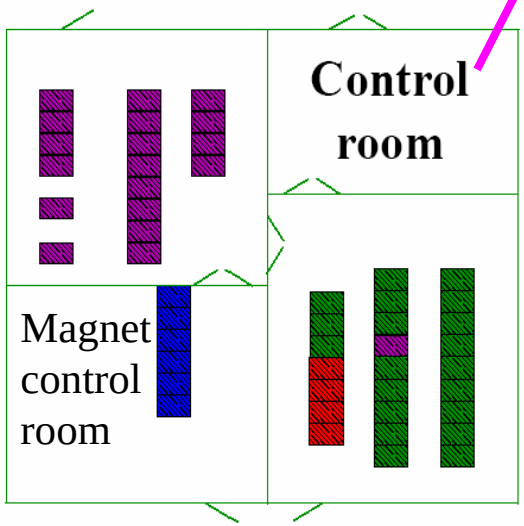
# Magnet Test: SX5 Resources and Cabling

*Gas, power (50HZ and 400Hz) , network, water and inertion systems in SX 5 and green barrack are limited*

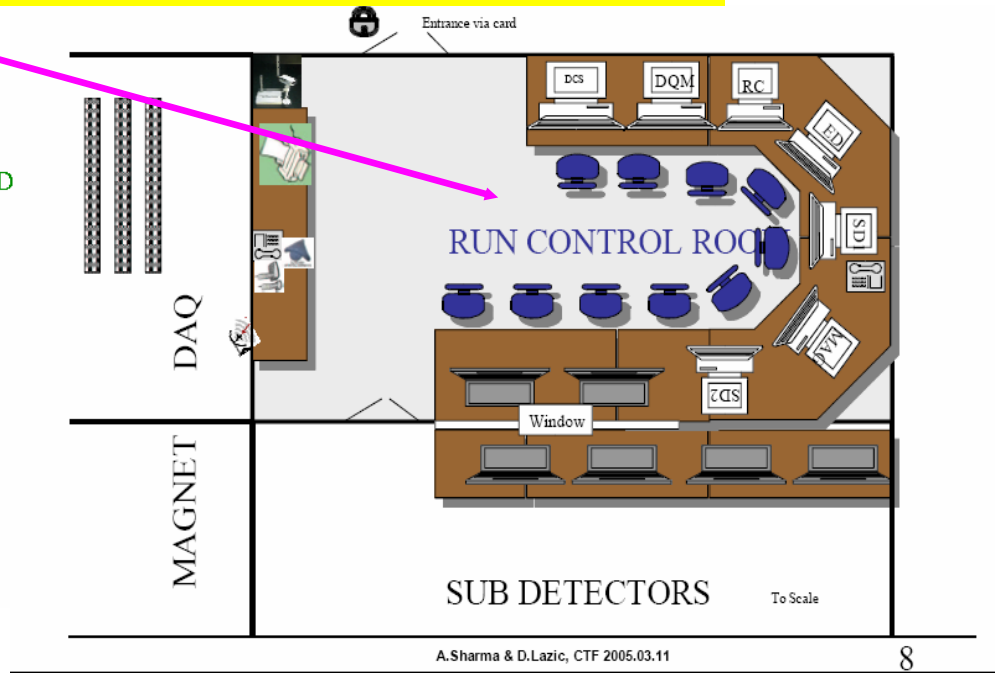



# SX5 Control Room

**This test brings the new S&C framework to a test with the detector itself. This nexus will be when S&C and M&O mesh to combine to first form a unitary detector. US CMS plans to be involved in both SX5 and remote operations and data monitoring. These activities will segue into data taking.**



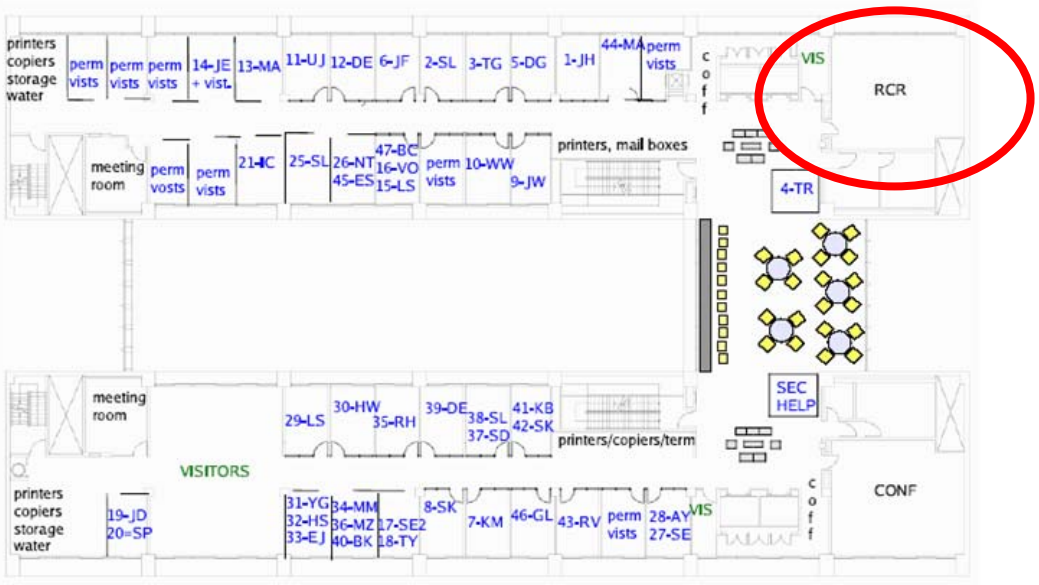

DAQ
Sub–det. FED
DSS
Magnet



# The ROC

- **Clearly the US CMS physicists want to be able to do DQM from the US.**
- **Our aim is to form a core of US physicists doing research (LPC) and standing shifts (ROC) at Fermilab.**
- **Clearly, there is an accelerator tie in – commissioning the low beta quads and participating in the LHC machine studies.**

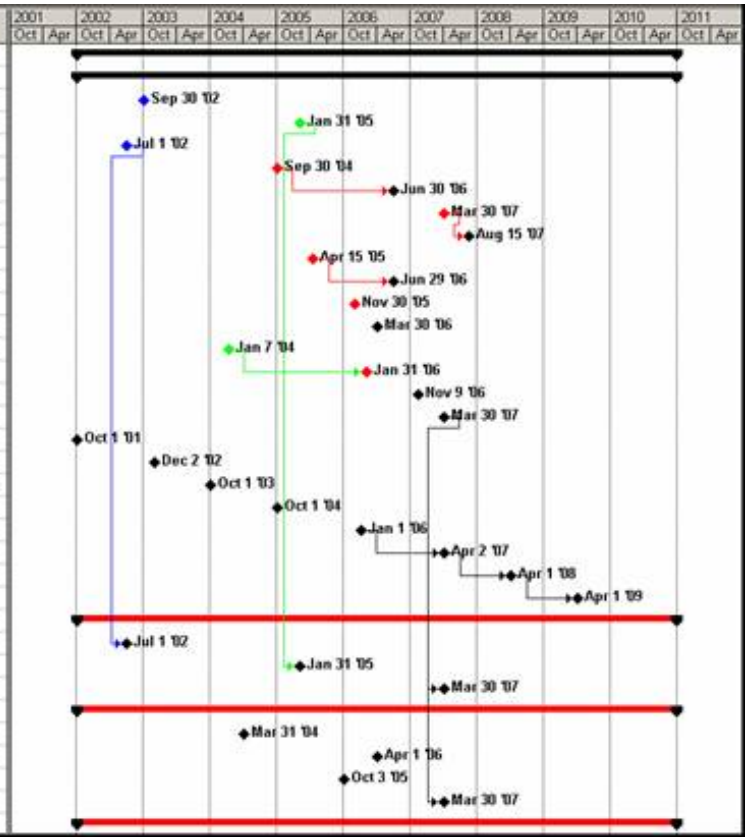
# Remote Operations Center




- for US CMS (Kaori Maeshima, FNAL, coordinator)
- for accelerator (FNAL staff at CERN Feb ’05 to discuss)
- Will tie into the SX5 slice tests in CY05-06. Already prototyped in test beam runs in 2003 and 2004 – e log, teleconferencing, etc.
- Erik Gottschalk heads FNAL group looking into ROC requirements

# RP - Schedule

| | WBS | Task Name |
|---|---|---|
| 1 | 18 | **Common Operations** |
| 2 | 18.0 | **CMS Milestones** |
| 3 | 18.0.1 | ME23/2 to CERN for SX5 Installation |
| 5 | 18.0.3 | ME1/2, ME1/3 Ready to Install |
| 7 | 18.0.5 | End Optics Installation in HB |
| 11 | 18.0.9 | ECAL FPPA, Link Delivery Complete |
| 12 | 18.0.10 | End Install, Test of EB in UX |
| 13 | 18.0.11 | Fpix at SX5, Ready to Install |
| 14 | 18.0.12 | End Install and Test of FPix in UX |
| 15 | 18.0.13 | TOB Complete |
| 16 | 18.0.14 | End Installation and Cable in UX |
| 17 | 18.0.15 | Finish Trigger Installation |
| 18 | 18.0.16 | Finish Trigger Commissioning |
| 19 | 18.0.17 | DAQ Slice Ready |
| 20 | 18.0.18 | DAQ 25% Performance Installed |
| 21 | 18.0.19 | Delivery of Production Core Software |
| 22 | 18.0.20 | CMS Ready |
| 29 | 18.0.27 | Cat A Costs Begun - RRB |
| 30 | 18.0.28 | DAQ TDR |
| 31 | 18.0.29 | Deliver Baseline Core Software for CCS and Physics TDR |
| 33 | 18.0.31 | CCS TDR |
| 36 | 18.0.34 | Physics TDR |
| 37 | 18.0.35 | Computing Systems- 20% Capacity |
| 38 | 18.0.36 | Computing Sysyems - 50% Capacity |
| 39 | 18.0.37 | Computing Systems - 100% Capacity |
| 109 | 18.2 | **Virtual Control Room** |
| 113 | 18.2.2 | VCR Prototype Ready for HCAL/EMU Readout |
| 122 | 18.2.5 | VCR Ready for Remote Operations |
| 131 | 18.2.8 | US CMS - Remote "Shifts" Ready |
| 148 | 18.3 | **Physics Analysis Centers and Collaboratory** |
| 153 | 18.3.3 | PAC Prototype Ready - 5% Data Challenge |
| 160 | 18.3.6 | PAC Installed - WH11 - 20% MDC |
| 161 | 18.3.7 | PAC - Guest Appointments Start |
| 165 | 18.3.9 | PAC - Analysis of First Data Starts |
| 178 | 18.3.14 | **Tier 2/PAC (3 of) Support** |




**There are strong connections between the Detector Construction Project, the SWC Program, and the M&O Program. The ROC and LPC are points of contact and overlap. The LPC and ROC are part of the RP M&O baseline planning – from the beginning.**

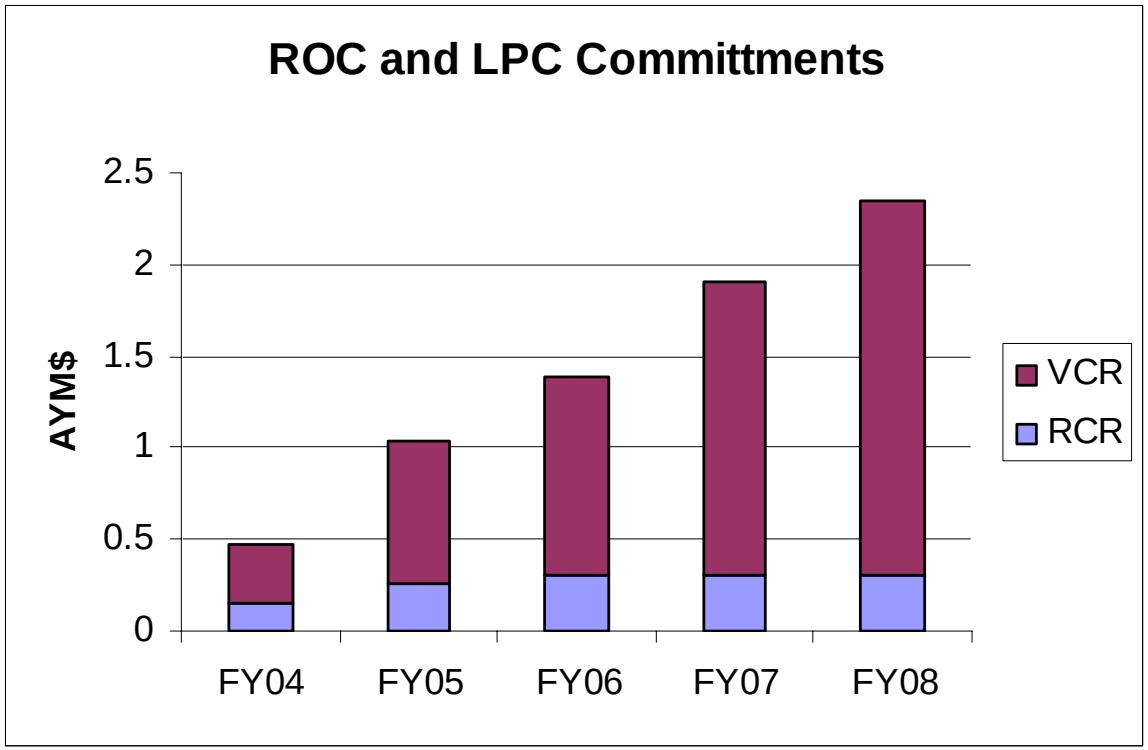
# Baseline Costs for ROC

| Task Name | M&S? | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| ⊞ CMS Category A M&O Costs | No | $371,000.00 | $545,000.00 | $847,000.00 | $1,257,000.00 | $1,699,000.00 | $1,993,000.00 |
| ⊟ Virtual Control Room | No | $69,375.00 | $158,750.00 | $257,500.00 | $297,500.00 | $297,500.00 | $297,500.00 |
| ⊞ Virtual Control Room FY02 | No | | | | | | |
| VCR Prototype Ready for HCAL/EMU Readout | No | | | | | | |
| ⊞ Virtual Control Room FY03 | No | $69,375.00 | | | | | |
| ⊞ Virtual Control Room FY04 | No | | $158,750.00 | | | | |
| VCR Ready for Remote Operations | No | | | | | | |
| ⊟ Virtual Control Room FY05 | No | | | $257,500.00 | | | |
| ⊟ Virtual Control Room FY05 M&S costs | Yes | | | $60,000.00 | | | |
| *subsystem maintenance m&s* | *No* | | | $60,000.00 | | | |
| ⊟ Virtual Control Room FY05 Software Profes | No | | | $112,500.00 | | | |
| *Computer Professional* | *No* | | | $112,500.00 | | | |
| ⊟ Virtual Control Room FY05 Technical Assis | No | | | $85,000.00 | | | |
| *project supported technician* | *No* | | | $85,000.00 | | | |
| ⊞ Virtual Control Room FY06 | No | | | | $297,500.00 | | |
| US CMS - Remote "Shifts" Ready | No | | | | | | |
| ⊞ Virtual Control Room FY07 | No | | | | | $297,500.00 | |
| ⊞ Virtual Control Room FY08 | No | | | | | | $297,500.00 |

**Program Funds**

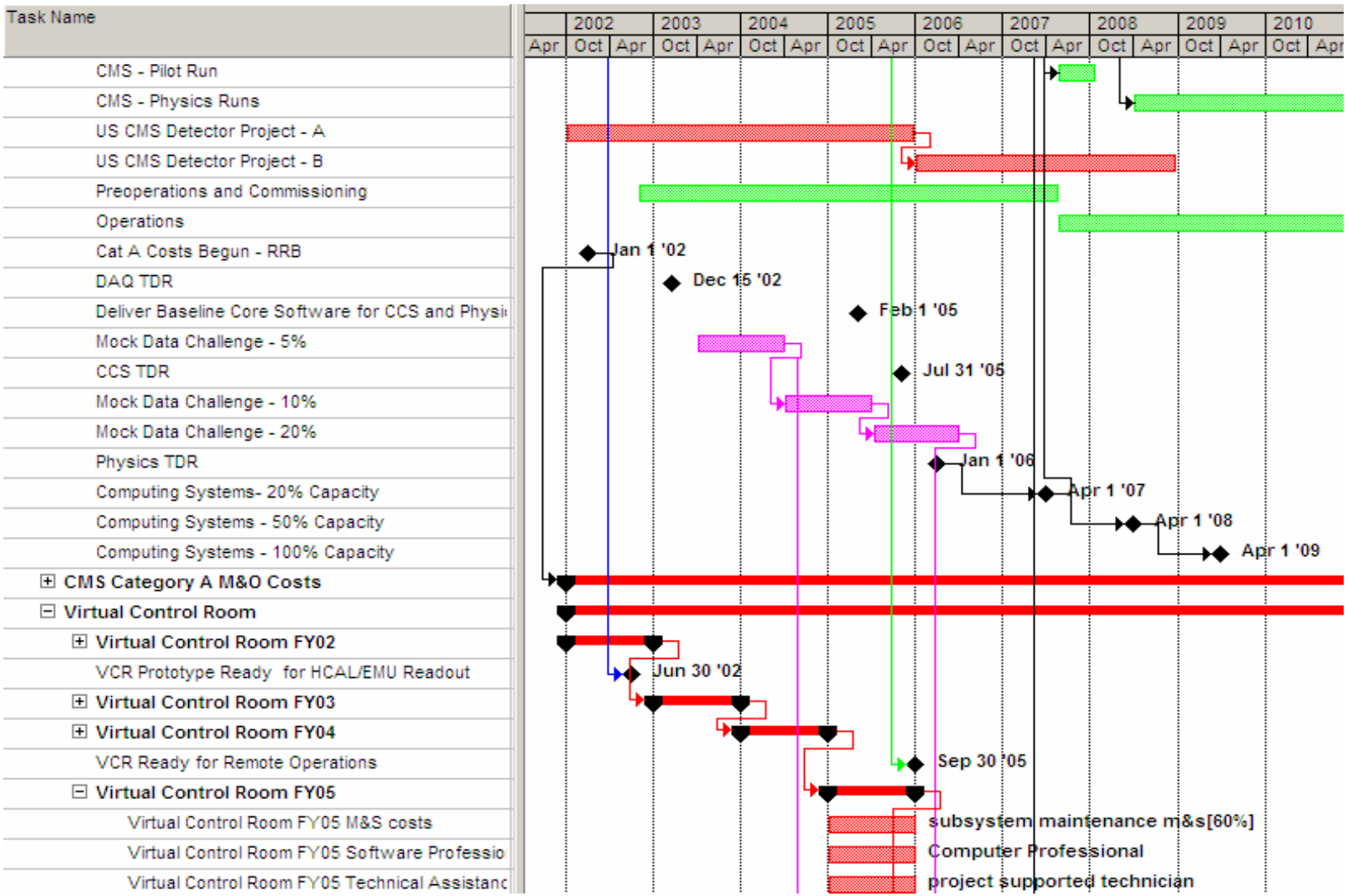
**Delayed startup of ROC – small M&S so far**

# LPC + ROC - Commitments




**M&O planning has M&S, CP, Tech, Sec, AA, CP and Guests as part of the LPC and ROC. This is the part of the M&O baseline which will likely evolve the most as we learn what the customers want/need and what works.**

# Remote Operations Center



# Summary

- The ROC is part of the US CMS plan to enable a core of US physicists to function well in the US.
- The ROC has been part of the Research Program baseline planning from the beginning.
- There is “buy in” (belatedly) from CMS.
- US CMS is now the only firm component of the future of FNAL after ~ 2008.
- Therefore, the ROC should be a very visible part of the FNAL program – with the LARP component also clearly visible.